



Prevalence of substance use and abuse in late childhood and early adolescence: What are the implications?

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ABSTRACT

The aim of the present study was to assess the prevalence by gender of substance use and misuse in late childhood and early adolescence.

A survey was conducted in 2013–2014 at primary and secondary schools of Padova, Veneto region, North-East Italy, on a sample of 171 pupils in 5th grade and 1325 in 6th to 8th grade.

Among the 8th graders, more than one in three males and one in four females had experimented with smoking, and more than half the boys and nearly half the girls had experience of alcohol. In this same age group, almost two in three males and one in three females had used energy drinks, and nearly 5% of the boys had experience of marijuana and/or stimulant drugs. In addition, almost one in four of the male students in 8th grade had experimented with three of these substances.

The middle school years should be identified as the first period at risk concerning the use of these drugs. Prevention programs should begin in early adolescence, focusing on delaying the use or abuse of any of the “gateway drugs.”

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Introduction

A stronger inclination to take risks is associated with adolescence, and this may prompt interest in experimenting with new types of behavior and situations. Maturational changes in the brain contribute to the behavioral traits typical of adolescence, which include a greater propensity to use drugs. Adolescence is consequently the developmental period at highest risk for the onset of alcohol and other drug use problems (Thatcher and Clark, 2008), and it is at this stage that students are likely to encounter drug abuse for the first time (Robertson et al., 2003).

For many substances such as alcohol, tobacco, and marijuana, the age at which a drug was first used is a strong predictor of later misuse (Kandel, 2002). For example, individuals who first use alcohol in the

age range of 11–14 years are at much greater risk of subsequently developing alcohol abuse or alcohol dependence (Zeigler et al., 2005). A meaningful study has demonstrated that age of initiating alcohol use is an important mediator of the effects of ethnicity, parents' drinking, proactive parenting, school bonding, friends' alcohol initiation, and perceived harmfulness of alcohol use and alcohol misuse at age 17–18. With the exception of gender, there was not a single significant effect on alcohol misuse at age 17–18 that was not mediated by age of initiation (Hawkins et al., 1997). Adolescents who start smoking when younger are also more likely to become regular smokers and less likely to quit (Chassin et al., 2000).

Another relevant issue is that the age at which such experimenting begins is gradually decreasing (Velleman et al., 2005), so up-to-date surveys are needed to ascertain the age at which young people begin to use these different substances. It is important to know the age of initiation of certain types of behavior in order to follow the trends and adapt health promotion measures to meet changing needs. Little information is available on alcohol use by 10-year-olds (in 5th grade): surveys of ongoing use are exceedingly rare, and retrospective recall by adolescents is not very reliable, the age of first use generally increasing, the older the adolescents are when they are questioned (Parra et al., 2003). The little contemporaneous data available suggest that alcohol

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use under age 10 is very low but not zero (Donovan, 2007). The Health Behavior in School-Aged Children (HBSC) study reports on the prevalence in early adolescence (12–13 years old) of alcohol and tobacco consumption, but not of other substances (Currie et al., 2012). Many other studies concentrate on ages 15–19, but prevention efforts should come earlier, before risk behavior occurs. Early interventions will be required before the preteen years (Storr et al., 2002).

Thus, even the great public health issue derived from substance abuse in young age is still lacking or scarce in literature on children aged 10–13, a description of prevalence of substance use behavior. The aim of the present study was to assess the prevalence by gender of substance use and misuse in late childhood and early adolescence.

Methods

Material and participants

This study was part of the “Project Pinocchio,” an addictions prevention project aimed at young of elementary and middle schools from Veneto Region (north-eastern Italy). A survey was conducted during the 2013–2014 school year at primary and secondary schools in the Veneto province of Padua, which is divided into six school districts. In each district, one or two secondary schools and one primary school were recruited on a voluntary basis to take part in a school-based scheme for underage substance abuse prevention. That is, from each district were selected schools that voluntarily agreed to participate in this prevention program. The sample of classrooms was drawn from within these schools using a random cluster sampling method, stratified by school year (grade). The scheme involves a sample of 171 pupils in 5th grade (10 classes) and 1325 students in 6th to 8th grade (76 classes). The students completed anonymous baseline questionnaires developed on the basis of research conducted by Gallimberti et al., 2011.

The questionnaire administered to the 6th to 8th graders consisted of 106 multiple-choice questions. Briefly, respondents were asked to provide socio-demographic information and details of their own smoking habits (tobacco and/or marijuana), consumption of alcohol and/or energy drinks, and/or stimulant drug use, recording both lifetime and ongoing use by means of explicit questions, such as, “Have you ever tried smoking?”, “Have you ever tried drinking alcohol?”, “Have you ever tried energy drinks?”, “Have you ever used energy drinks together with alcohol beverages?”, “Have you ever smoked marijuana?”, “Have you ever tried stimulant drugs?” (Yes, No). If the answer was yes, “How many times have you smoked a cigarette in the past month?”, “How many times have you drunk alcohol in the past month?”, “How many times have you used energy drinks in the past month?”, “How many times have you used energy drinks together with alcohol beverages in the past three months?”, “How many times have you smoked marijuana in the past month?”, “How many times have you used stimulants in the past month?” (Never, About once a month, About once a week, More or less every day). Among the core questions, the question left unanswered the least often (in 1.13% of cases) concerned lifetime use of marijuana, while the question left unanswered the most often (3.77%) concerned binge drinking. The data-cleaning process only led to one questionnaire being discarded.

The questionnaire administered to the primary school children contained 74 multiple-choice questions. Briefly, respondents were asked to provide socio-demographic information and details of their own smoking habits and consumption of alcohol and/or energy drinks, in terms of lifetime use, by means of explicit questions, e.g. “Have you ever tried smoking?”, “Have you ever tried drinking alcohol?” “Have you ever tried using energy drinks?”, “Have you ever tried using energy drinks together with alcohol?” (Yes, No), “How many times have you used energy drinks in the past month?” (Never, About once a month, About once a week, More or less every day). Among the core questions, the question that was left unanswered the least often (by 1.17% of the

sample) concerned lifetime use of alcohol and lifetime use of energy drinks, while the highest proportion of unanswered questions was 4.1% for current energy drink consumption together with an alcohol beverage. None of the questionnaires were discarded during the data-cleaning process.

Statistical analysis

The proportions and 95% confidence intervals were calculated taking the school and classroom clustering of the sample into account, and stratifying the sample by gender.

The statistical analyses were performed using STATA software, ver. 12.0.

Ethical issue

Approval for the study was obtained from the Ethical Committee at Padua Teaching Hospital. Consent to the students' participation was required first from the school director. If this was granted, the prevention program was included in the school's teaching plan, which is signed by the parents at the start of the school year. Then all parents of the students enrolled were asked to return a signed consent form, and an assent form was also signed by the students themselves. Among the parents approached, 9.9% refused permission for their child to take part in the survey. Among all the students for whom consent had been obtained, 89.4% were present on the day of data collection and took part in the survey.

Results

The prevalence distributions for lifetime substance use by school grade and by gender are shown in Fig. 1.

Among the 6th graders, 6.9% of the males [CI95% 4.1–9.7] and 3.6% of the females [CI95% 0.0–7.3] had experience of cigarette smoking, and this percentage was to 41.2% [CI95% 26.4–56.1] for males and 25.9% [CI95% 19.7–32.2] for females among the 8th graders. The proportions were higher for alcohol consumption. Among the 6th graders, 35.7% [CI95% 24.7–46.6] of the males and 25.6% of the females had already drunk at least one alcohol beverage and the proportions were to 59.0% [CI95% 49.2–68.7] for males and 45.9% [CI95% 40.9–50.9] for females in 8th grade.

As for drug-taking, 5.6% [CI95% 1.4–9.8] of the boys in 8th grade and 3.3% [CI95% 0.0–8.8] of the girls had smoked marijuana, while 4.6% [CI95% 1.3–7.9] of the boys and 2.7% [CI95% 0.0–5.9] of the girls had tried stimulant drugs.

Fig. 2 shows the number of substances the adolescents had already tried in their lifetime.

Fig. 3 shows the prevalence distributions for ongoing substance use by school grade and by gender.

In the sample of 8th graders, 30.2% [CI95%17.2–43.2] of the males and 20.7% [CI95% 11.0–30.4] of the females had drunk at least one alcoholic beverage in the previous month, 3.6% [CI95% 1.0–6.2] of the males and 1.1% [CI95% 0.0–3.8] of the females had smoked marijuana at least once in the previous month, and 3.0% [CI95% 0.2–6.0] of the males and 1.7% [CI95%0.0–4.4] of the females were ongoing stimulant drug users.

Discussion

Our findings indicate that smoking and both alcohol and energy drink consumption increment steadily with age in early adolescence – from 5th grade onwards – in both males and females, albeit with some gender-related differences, while 8th grade is the age showing a rising curve in the use of marijuana and stimulant drugs, especially in males.

In particular, our study showed that the number of adolescents who were smoking at least once a month increased steeply in 8th grade,

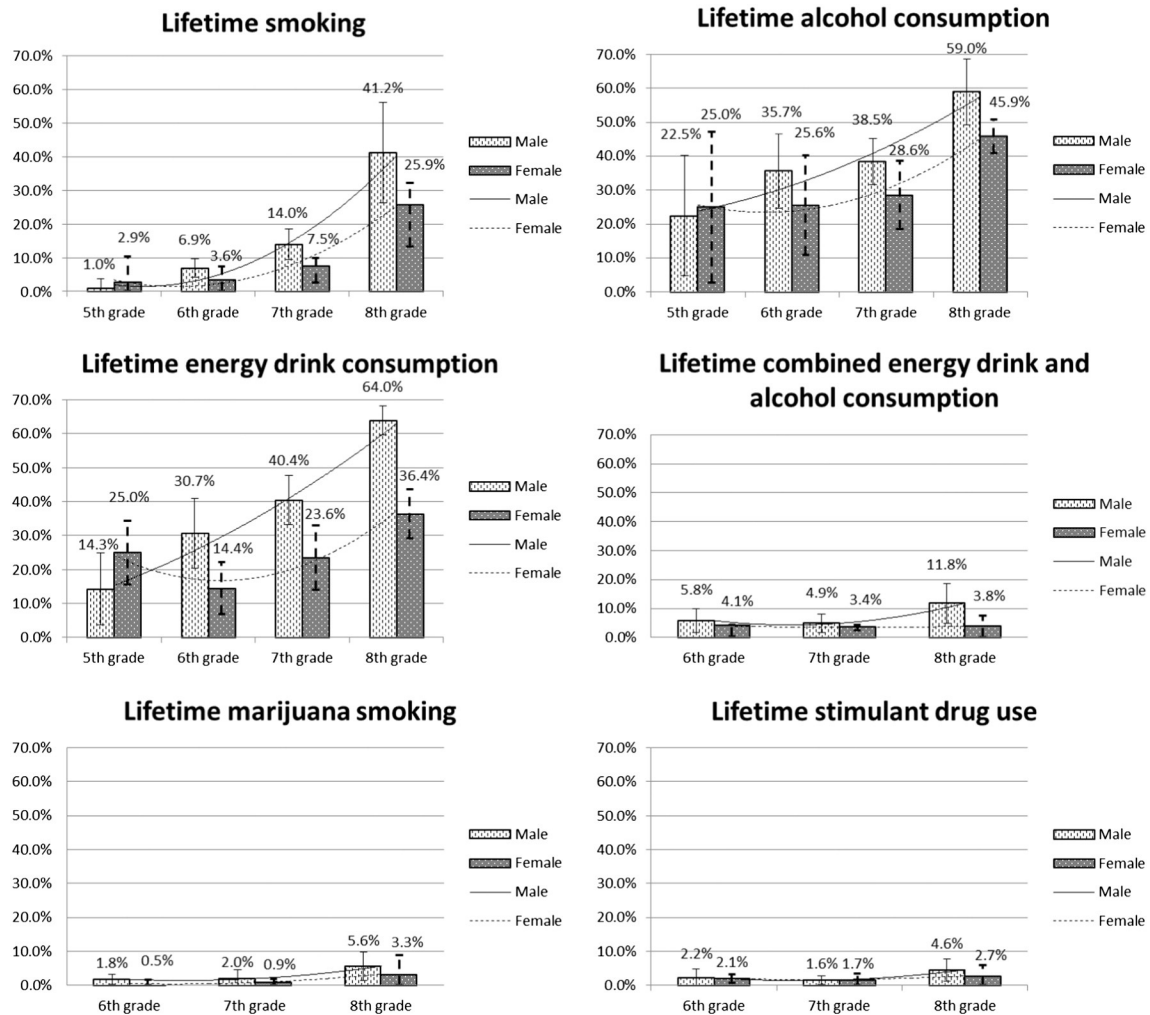


Fig. 1. Prevalence distributions of lifetime substance use in different school grades by gender in Padova, Veneto region, North-East Italy, in 2013–2014.

although there were still few who smoked daily. These figures are consistent with the findings reported by the HBSC in Padua (Mirandola et al., 2010). In this age group, even smoking experimentally coincides with a significant 16-fold increase in the risk of becoming a smoker in adulthood by comparison with not smoking at all (Chassin et al., 1990). The wish to “experiment” typical of adolescent age encourages some teenagers to try cigarettes too, but for children who have already tried one or two cigarettes, the odds of them acquiring the habit is four times higher than for those who have never smoked. Once people have acquired the habit, it is difficult to stop and smoking is likely to be a long-term addiction (McNeill et al., 1989). These data confirm the importance of primary prevention programs directed at children and early adolescents to avoid them ever smoking at all, and prevention efforts focusing on younger children should be designed to discourage any experimentation, even just a puff. Starting prevention programs at high school is too late. In fact, HBSC data confirm that 19% of 15-year-old students in Italy smoke at least once a week (Cavallo et al., 2013), while in the USA the figure is 8.5% (Currie et al., 2012).

Judging from our study, in 8th grade almost one in three boys and one in five girls drink alcohol at least once a month, and 6.2% of males and 1.1% of females are at least weekly alcohol drinkers. These findings are comparable with the data for Italy emerging from the HBSC survey 2010, which indicated that 20.7% of 13-year-olds drink alcohol at least monthly (Cavallo et al., 2013). These figures indicate high alcohol drinking rates among younger adolescents and confirm that in Italy their contact with alcoholic beverages is extremely early and frequent.

The use of alcohol at an early age is associated with future alcohol-related problems (Kokotailo, 2010). Data from the National Longitudinal Alcohol Epidemiologic Study (Grant and Dawson, 1997) substantiated the conviction that the prevalence of lifetime alcohol dependence and alcohol abuse show a striking decrease with increasing age at onset of use. For people aged 12 years or younger at the time of their first use, the prevalence of lifetime alcohol dependence was 40.6%, whereas it was 16.6% for those who began to drink at 18 years old, and 10.6% for those who started at 21 years of age. Similarly, the prevalence of lifetime alcohol abuse was 8.3% for those who started drinking at 12 years or younger, 7.8% for those who started at 18 years old, and 4.8% for those who started at 21. The early onset of alcohol intake has been linked to familial and peer factors and the perception of the alcohol's dangerousness. Indeed, research shows that parents' drinking, proactive parenting, peer influences, and perceptions of the harm drinking causes, all measured in late childhood, will affect the age of alcohol initiation, and this in turn affects the risk of alcohol misuse in late adolescence (Hawkins et al., 1997). Moreover, early alcohol initiation has also been associated with greater sexual risk-taking (unprotected sexual intercourse, multiple partners, being drunk or high during sexual intercourse, and pregnancy) (Stueve and O'Donnell, 2005), academic problems, other substance use, and delinquent behavior in mid- to late adolescence (Ellickson et al., 2003).

These data go to show that prevention strategies regarding alcohol consumption should also be implemented already in early adolescence. Judging from the HBSC data, as many as 25.6% of Italian 15-year-olds

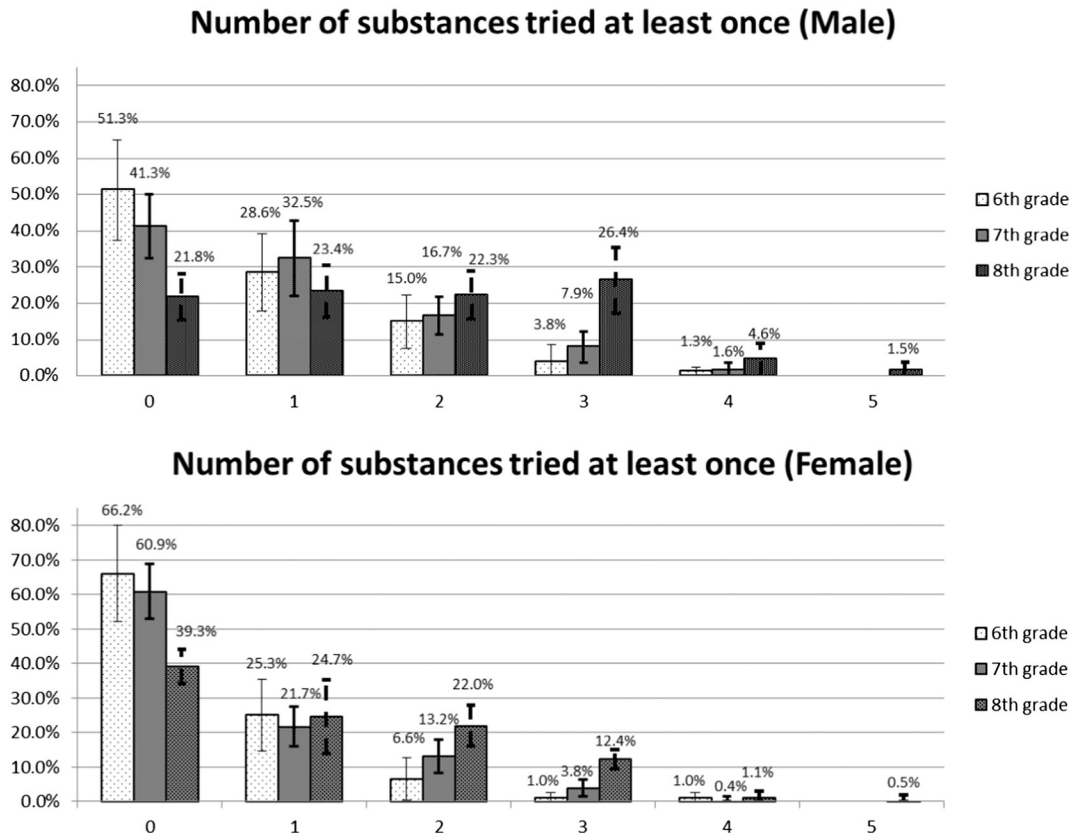


Fig. 2. Prevalence distributions of number of different substances tried at least once in a lifetime (tobacco, alcohol, energy drinks, marijuana, stimulant drugs) in different school grades by gender in Padova, Veneto region, North-East Italy, in 2013–2014.

(Cavallo et al., 2013) and 10.0% of American 15-year-olds drink alcohol at least weekly (Currie et al., 2012).

We found that more than one in three male 8th graders and one in ten female 8th graders use energy drinks at least once a month. These figures confirm a previous study of ours, which showed that energy drinks have recently become very popular among very young adolescents (Gallimberti et al., 2013). They are readily available, inexpensive psychoactive substances (Carroll, 1998). In Europe and the USA, there are still no data available on energy drink consumption among early adolescents, and this shortcoming needs to be overcome. Miller (2008) suggested that frequent energy drink consumption may be a marker of a high risk of health-jeopardizing behavior, and even went so far as to say that the frequent consumption of energy drinks may serve as a useful screening indicator for identifying students at risk of substance use and/or other behavior harmful to health. By means of a cross-sectional study on undergraduate students, Miller found strong support for the hypothesis that energy drink consumption is a part of the problem behavior syndrome, occurring concomitantly with substance use and other forms of risk-taking behavior. The rapid-onset stimulant effects of energy drinks may also encourage users to seek the more intense effects of prescription and illicit stimulants (Reissig et al., 2009).

Our data also showed that even some young adolescent students had used energy drinks in combination with alcoholic beverages at least once in the previous 3 months. Consistently, a previous study of ours had found that cigarette smoking and alcohol use were risk factors associated with the habitual use of energy drinks in early adolescence (Gallimberti et al., 2013). These findings support the need for prevention strategies and regulation to avoid energy drink use in early adolescence.

Our survey also analyzed marijuana smoking in very young adolescents, revealing a startling increase in this phenomenon. Our data are unique in that no data had so far been collected on marijuana smoking

in Europe in this age group (5th to 8th grade). The HBSC study on Padua showed that, among 15-year-olds, almost one in five males and one in six females had tried smoking marijuana (Mirandola et al., 2010). This suggests a marked increase in the use of marijuana between 13 and 15 years of age, so it may be that prevention programs concerning marijuana smoking are needed in very early adolescence.

Our study also revealed a remarkably high percentage of adolescents using stimulant drugs (nearly 5%) already at an early age (13 years old), and this could again point to the need to start strategies to prevent the use of stimulant drugs use already at this age.

Finally, it was notable from our data that almost one in five 8th grade students had experimented with 3 different substances. This could be indicative of a higher risk of several substances being used the older the adolescent population. According to the gateway model, drug use progresses from no drug use to beer or wine, then to cigarettes or hard liquor, to marijuana, and eventually to other illicit drugs (Kandel et al., 1992), and this seems to be confirmed by our finding that the number of drugs tried by the students increased with increasing age. In any case, these data are alarming and suggest that prevention strategies and parental monitoring need to be in place early on, for early adolescents from 5th grade onwards. Prevention programs should also be adapted to suit the age of the target, since the potential impact of specific risk and protective factors changes with age. For instance, risk factors within the family have more impact on a younger child, while association with drug-abusing peers may be a more significant risk factor for an older one (Kumpfer and Alvarado, 2003).

A limitation of our study concerns the sampling method used: although all the primary and secondary schools in the province were invited to take part in a school-based prevention program, only eight secondary schools and five primary schools agreed to do so. This method may lead to a sort of voluntary response bias since the schools agreeing to take part in the study may be more sensitive to substance

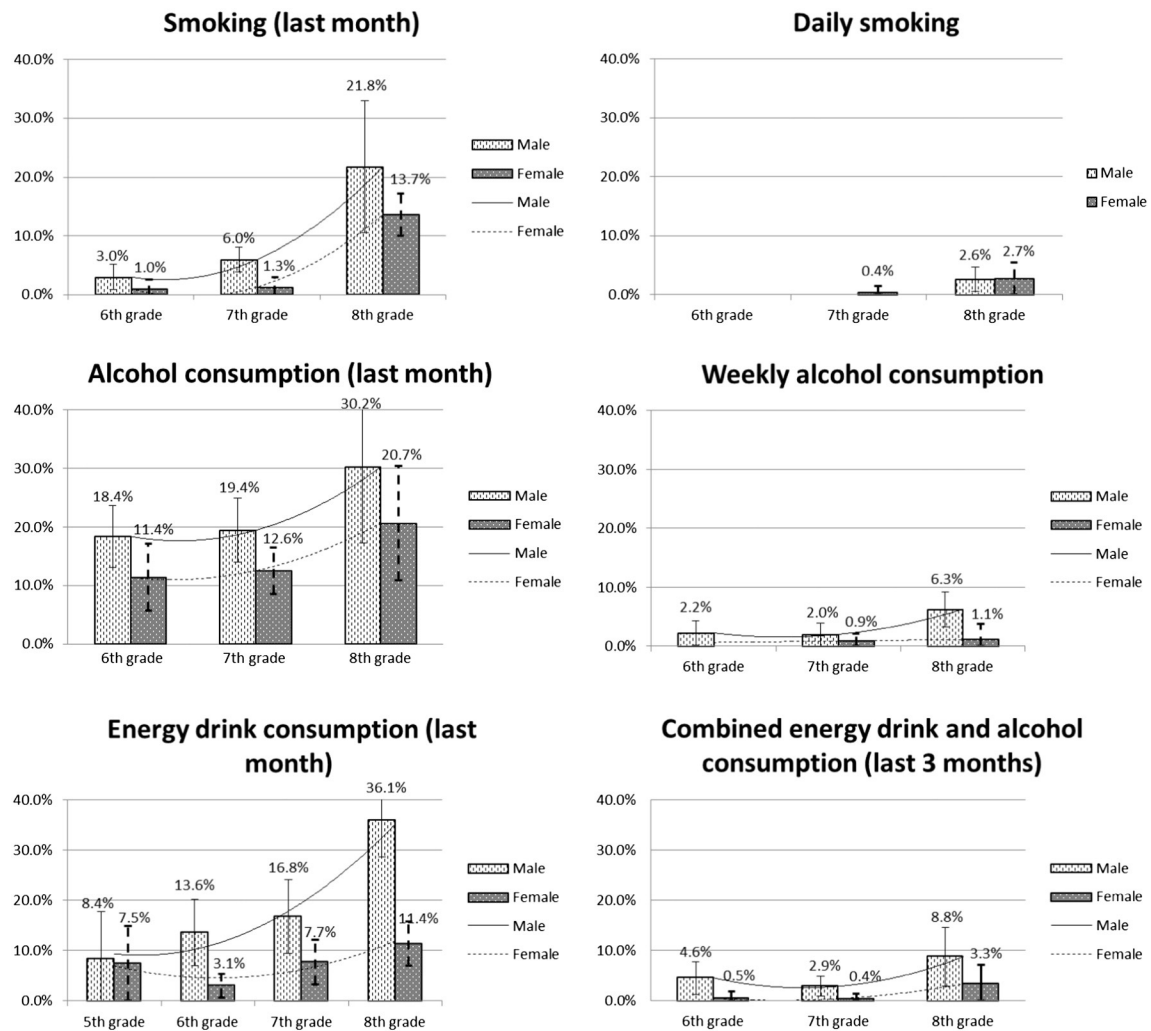


Fig. 3. Prevalence distributions of ongoing substance use in different school grades by gender in Padova, Veneto region, North-East Italy, in 2013–2014.

abuse prevention because of a higher prevalence of substance consumption by their students. Another limitation of our study is that the study involved only children inside an Italian province. Although childhood development is generally consistent regardless of geography, there might be some differences in the substance use of our sample that may be due to cultural factors. For instance, there is a lack of a minimum drinking age in many European countries (including Italy). Indeed, in many of these European countries, alcohol is traditionally linked to socializing and feasting habits of the population (Kokkevi et al., 2007). Having said that, our data are generally consistent with those generated by previous international lifestyle surveillance surveys in our area that produced figures on alcohol and cigarette consumption in early adolescence. Such surveys lack data on 5th grade children, however, and did not collect data on early adolescents' energy drink, marijuana, or stimulant drugs consumption. The consistency between our findings and those of other international surveys – for the substances considered in both – entitles us to assume that our prevalence data are also reliable for the other substances not considered in other surveys. The only difference between our data and those of other international surveys concerns the numbers of male 8th graders who experiment with cigarette smoking. After double-checking to rule out any possible recording errors, we concluded that this difference is probably due to the comparison being drawn between different years (2010 and 2014) because more recent data for comparison with our own are unfortunately not available. Figures comparable with our data had already been reported in our province in the past, in 2002 (Mirandola et al., 2010).

Conclusion

Early adolescence should be identified as the first period at risk for the use of the drugs discussed here (Pentz et al., 1989). Prevention programs should therefore focus on early adolescents, and particularly on the years of transition from primary to secondary school (6th and 7th grade), in an effort to delay the onset of use or abuse of one or more of the “gateway drugs” (tobacco, alcohol, and marijuana).

Conflict of interest statement

The authors have nothing to disclose.

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